



Telemedicine – Health Care Technology Improving Access, Efficiency, and Continuity of Care

“Telemedicine has vast potential to improve both patient- and system-level outcomes; however, these benefits are not automatic. Policy decisions about the extension of telemedicine must be informed by careful evaluations of exactly how telemedicine affects outcomes and whether these outcomes justify the associated costs.”

John G. Demakis, MD

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What is telemedicine?

Telemedicine is the use of electronic information and communications technologies to provide and support health care when distance separates the participants. The earliest documented use of telemedicine was a demonstration project in Nebraska in the late 1950s, in which closed circuit television was used to provide mental health services from the University medical center to a state hospital over 100 miles away.¹ Today, telemedicine includes a wide and rapidly expanding array of technologies and approaches for communicating patient data, voice or images in order to assist, augment or replace in-person clinical encounters. These technologies range from the simple and inexpensive to the complex and costly.

How does telemedicine impact veterans' health care?

Telemedicine serves a variety of purposes. In addition to telemedicine between hospitals, and between ambulances and hospital trauma units, VA pursues telemedicine applications that link patients and family members to information that can help them make more informed health care decisions. The potential to create or improve access to health services, especially in rural areas, remains a top VA priority. Following are some examples of various telemedicine applications that are used within the VA to improve the care of our veterans.

- **Telecardiology:** VA's Pacemaker Surveillance Center Program, located at the Washington, DC and San Francisco VAMCs, provides follow-up pacemaker monitoring for thousands of patients each year.

- **Tele dermatology:** Dermatologists at the Baltimore VAMC use video-conferencing and store-and-forward imaging to assess skin conditions.
- **Tele mental Health:** A demonstration project at the Milwaukee/Iron Mountain VAMCs provides improved access to rural mental health care using compressed digital video-conferencing linkages.
- **Tele nuclear Medicine:** For more than 20 years, nuclear medicine images have been shared regularly among VAMC's using cost effective, "low-tech" transmission to facilitate consultative services.
- **Tele pathology:** The Milwaukee/Iron Mountain VAMCs in VISN 12 are linked by a unique, award-winning telepathology system that uses a hybrid, dynamic, store-and-forward technology.
- **Tele radiology:** VA has led the way in the development and implementation of filmless digital radiology systems in clinical settings. In 1993 the Baltimore VAMC implemented the first filmless radiology department in the U.S.
- **Telephone Liaison Care Program:** Telephone liaison care programs are in place at all VAMCs to provide information, guidance and direction for patients.²

Why is telemedicine important to VA managers?

The potential for telemedicine to improve both access to care and continuity of care for veterans when distance and

time present major obstacles is as limitless as the technologies that support this type of patient care. Further, telemedicine may be more of a necessity than a cost-saving convenience for those veterans living in rural areas where there is limited access to medical facilities, or for those who are disabled and/or have limited mobility. Telemedicine has vast potential to improve both patient- and system-level outcomes, yet this is a new area and there are many questions that need to be answered. For example, many issues surrounding the efficacy, impact and cost of telemedicine need to be addressed.

HSR&D supports numerous studies that focus on the use of telemedicine. Below are recent findings from some of these HSR&D studies.

Teledermatology results in reliable and accurate diagnoses

Teledermatology, using digital imaging technology to assess dermatologic conditions, holds great promise as an alternative means of dermatologic health care delivery. Digital imaging generates digitized versions of visual information that can be transmitted within telemedicine networks. This HSR&D study evaluated the reliability and accuracy of dermatologists' diagnoses and treatment plans generated from telemedicine consultations when compared to clinic-based consultations.

Investigators studied a sample of patients with skin lesions that were referred to a dermatology consult service. Two different clinic-based dermatologists and three different digital image consultants independently evaluated each lesion. The skin conditions included in the study reflected a wide range of dermatologic disease found in the ambulatory care population of the Durham VAMC. With the data analysis nearly complete, the study indicates that there was a comparable level of diagnostic agreement found between digital image examiners and clinic-based examiners. This means that dermatologists agreed on their diagnoses of skin lesions equally well whether evaluating the patient in person or reviewing the digital image. Data thus far also shows that diagnostic accuracy is comparable among clinic-based examiners and digital image examiners.

This suggests that comparable diagnostic outcomes can be expected using teledermatology consults as a substitute for traditional clinic-based evaluations. The knowledge that digital imaging produces reliable and accurate diagnostic outcomes, invites further investigation of other health services research questions about teledermatology in regard to patient satisfaction, access to care, and cost-effectiveness. Teledermatology may be especially important to those veterans who live in rural areas and do not have access to adequate clinical consultation services.

Whited JD. Teledermatology: Diagnosing dermatologic lesions by digital imaging. HSR&D study #IIR 95-045.

Telecare improves ambulatory care for veterans

Diabetes mellitus is one of the leading causes of morbidity, mortality and costs in the VA, and complications associated with diabetes are the leading cause of blindness, end-stage renal disease, and amputation in the western world. An HSR&D study evaluated the use of automated voice messaging (AVM) with nurse telephone follow-up to improve the health and self-care of veterans with diabetes.

This study looked at 300 patients with diabetes mellitus from clinics within VA's Palo Alto health care system. Patients were randomly assigned to usual care, or usual care and AVM intervention. Patients who received the AVM intervention were called weekly to monitor their health status and provide the first line of clinical intervention for self-care and health behavior problems. The study nurse would then use the patient's responses to the AVM calls to determine an appropriate patient and/or health care provider follow-up. Results of this study show that the automated system identified a number of serious health problems that otherwise might have gone undetected, thus avoiding acute events and subsequent hospitalization.

This study shows that a telephone-based disease management system may be a viable "clinical extender" for diabetic patients, bringing monitoring, diabetes education, and behavior support services into the homes of VA patients with diabetes.

Piette JD. Automated calls with nurse follow-up to improve diabetes ambulatory care. HSR&D study #IIR 95-084.

Piette JD. Moving diabetes management from clinic to community: development of a prototype based on automated voice messages. The Diabetes Educator, 23: 672-80, 1997.

A similar HSR&D study is evaluating the Telephone-linked Computer (TLC) System, a computer-based telecommunications system that can monitor, educate and counsel patients with chronic obstructive pulmonary disease (COPD) through regular automated conversations in patients' homes. Subject enrollment is ongoing, but it is anticipated that application of TLC in patients with symptomatic COPD will lead to earlier detection of clinical deterioration, permitting more timely intervention by health care providers and improved self-care, such as adherence to medication regimens. Telecare, such as the kinds used in these HSR&D studies, has the potential for significant cost savings.

Sparrow D. Effectiveness and cost impact of a telecommunications system in COPD. HSR&D study #IIR 97-022.

Telephone counseling improves physical activity in older patients

Many older individuals are at high risk for health complications and functional impairment due to low levels of physical activity. Patients with arthritis, heart disease,

hypertension, depression, and other problems common in veterans could benefit by increased physical activity. This HSR&D study's primary objective is to determine whether or not telephone counseling provided by a nurse would assist 60- to 80-year old veterans, who are VA primary care patients, in establishing and maintaining a walking regimen.

This randomized controlled trial compares three levels of telephone counseling over 12 months: 1) 20 calls initiated by the nurse; 2) 10 calls initiated by the nurse and 10 initiated by an automated telephone message delivery system; or 3) no follow-up calls. Self-reported walking for the 210 patients enrolled in this study is assessed from weekly diaries and confirmed by significant others. Smoking status, physical symptoms, gait and balance, and psychosocial variables including mood, stress, exercise confidence, and social support are all evaluated in relation to the walking regimen. Primary care visits are also monitored throughout the exercise intervention.

Preliminary analyses show that the daily physical activity of the study participants is unrelated to demographics or health variables, but is associated with recall of provider advice to exercise. In other words, a patient who lives in a rural area and/or is having a physical problem is more likely to walk if he speaks to the nurse counselor. Increased physical activity, such as walking, could improve quality of life as well as decrease risk and disability in a large number of elderly veterans. Results of this study will help inform decisions about cost-effective methods for exercise and other health promotion counseling in primary care settings. It also will improve physical activity among elderly patients, which can result in significant health benefits.

Dubbert P. Nurse counseling for physical activity in primary care patients. HSR&D study # NRI 95-022.

References:

1. *Telemedicine*, <http://vaww.va.gov/telemed/> 10/25/99.
2. VA Research & Development, *Solicitation for Research on Cross-Cutting Issues in Telemedicine*, <http://vaww.va.gov/resdev/ps/pshsrd/ccissues.htm> 10/25/99.

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